

ER Site No. 48: Bldg 904 Septic System (TA-II)

ADS: 1303

Operable Unit: Tech Area II

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Site History

From 1947 through 1992, two effluent systems served Building 904. One system handled sanitary (septic) water, and the other system (the High Explosive [HE] drain system) handled waste water. In 1993, the effluent systems were taken out of service when Building 904 was connected to the City of Albuquerque (COA) interceptor sewer line that runs along the floor of Tijeras Arroyo. Building 904 was constructed in 1947 and was initially used for the assembly of nuclear weapons. The building was demolished in late 2002. The building was located in the south central portion of Technical Area-II (TA-II) and covered approximately 10,000-square feet (ft). Building 904 was constructed with 1.5-ft thick concrete walls that separated the various weapon-assembly bays; the original floor plan was identical to that of Building 907.

The Building 904 septic system extends westward from the northwest corner of the building foundation and consists of a 900-gal concrete septic tank, a 5-ft-diameter by 13-ft deep seepage pit, and 150 ft of drainfield pipe. The bottom of the seepage pit is about 15 ft below grade. The drain field is located in the west-central portion of TA-II. Floor drains were located in each room in Building 904, including the HE assembly and packaging rooms. The floor drains, fume-hood drains, and sinks may have been cross-connected between the septic system and the HE drain system due to remodeling over the years. In 1995, waste from removed from the septic tank and samples were collected. The empty tank was inspected by New Mexico Environmental Department (NMED) in late 1995.

Concrete samples of the septic tank also were collected. In 2000, the perimeter of the septic tank was excavated and soil samples were collected; a backhoe was used to trench across the drainfield for the purpose of mapping the drainfield. The tank and drainfield were left in place.

The HE drain system extends southward from Building 904 to the northern rim of Tijeras Arroyo. Engineering drawings show that small research rooms in Buildings 913 and 914 also were connected to the HE drain system. The total length of the HE drain system was approximately 800 ft. While in service, a HE catch box collected HE particulates by mechanical

filtration of the waste water. The HE catch box (also known as the solids retention tank) is still located approximately 350 ft south of Building 904. The top of the catch box is 5 ft below grade. From the catch box, the HE drain system extends southward for approximately 500 more ft where the waste water discharged into a pair of outfall ditches ([ER Site 227](#) and [ER Site 229](#)). These two sites are managed by the Tijeras Arroyo Operable Unit.

During nuclear weapons assembly operations in the early 1950s, eight to ten employees worked three 8-hour shifts per day. During assembly work, HE blocks were shaved or machined to fit into the nuclear weapons. During the assembly operations, HE shavings fell onto the floor, but sweeping was not permitted because the sweeping could generate static electricity resulting in an explosion. Floor debris and explosive materials, including Baratol, Compound B, and black powder were flushed down the assembly bay floor drains with large quantities of water and discharged into the HE drain system. The assembly bays were washed down daily; a mixture of waste and possibly kerosene may have been used to clean the floors. The floor drains appear to have been designed to capture large volumes of waste water possibly containing kerosene and small amounts of HE materials.

Between 1948 and 1951, weapons-assembly work areas and equipment were typically cleaned with carbon tetrachloride. This chemical was used liberally (up to 3 gal/month) until about 1951, when it was replaced with trichloroethylene (TCE) because the carbon tetrachloride vapors caused headaches. The TCE was reportedly "used like water" for cleaning and employees opened the building doors for ventilation.

In the late 1950s, nuclear weapons assembly operations were discontinued and the building was converted into an explosive testing and development facility; an HE chemistry laboratory also was added. Chemicals used in the laboratory may have included methyl ethyl ketone (MEK), acetone, carbon tetrachloride, hexane, xylene, Freon compounds, toluene, alcohols, TCE, and methylene chloride. The explosive testing and development operations involved mixing small quantities of explosives in separate handling areas. Residues were not flushed down the floor drains; however, small amounts of cleaning compounds may have been discharged to one or both of the effluent systems after cleaning the testing devices. Components were typically cleaned with toluene, petroleum distillates, isopropyl alcohol, nitromethane, acetone, and methanol.

Starting about 1968, Building 904 was used as an environmental and functional testing laboratory for weapon components. In 1969, Building 904 was enlarged with the addition of a darkroom for processing X-ray film. Photographic processing solutions, which may have contained cadmium, silver, chromium, and cyanide, may have been discharged to the Building 904 effluent systems.

During the 1970s, an explosive shock test facility was also located in the building, and in 1975, several rooms were converted for nuclear materials safeguards and security research with chemical deterrents using foams and smokes. Some organic compounds and cleaning agents were also used, including acetone, methylene chloride, ammonium hydroxide, titanium, and tetrachloride.

To summarize, the waste water contained:

- organic compounds including acetone, methylene chloride, trichloroethylene (TCE), methyl ethyl ketone (MEK), nitromethane, carbon tetrachloride, toluene, xylenes, Freon™ compounds, hexane
- various alcohols (methanol and isopropyl)
- metals (barium, cadmium, chromium, lead, silver, and titanium)
- HE compounds such as Baratol, Compound B, and black powder
- inorganic compounds including ammonium hydroxide and cyanide
- petroleum distillates such as kerosene
- and possibly traces of radionuclides such as cesium-137, uranium-235/238, plutonium-239, and tritium.

In 1992, the ER Project began conducting groundwater studies at TA-II. These studies along with other Solid Waste Management Unit related investigations were eventually incorporated into the Tijeras Arroyo Groundwater (TAG) Investigation. TA-II is located in the center of the TAG study area. The hydrogeologic setting of the study area is dominated by two water-bearing zones, the perched system and the regional aquifer, both of which are present within the upper Santa Fe Group. The perched system is not used for water supply. However, the COA, Kirtland Air Force Base (KAFB), and the Veterans Administration (VA) utilize the regional aquifer for water-supply purposes. At TA-II, the depth to the perched system is approximately 310 ft below ground surface (bgs). The perched system covers approximately 3.5 square miles in the central part of the TAG study area and may extend across the northern boundary of KAFB. The direction of groundwater flow in the perched system is to the southeast. Discontinuous, yet overlapping multiple lenses of unsaturated alluvial-fan sediments serve as a perching horizon beneath the perched system and above the regional aquifer. At TA-II, the depth to the regional aquifer is approximately 520 ft bgs. The direction of groundwater flow in the regional aquifer is principally to the northwest towards the KAFB, COA, and VA water-supply wells. Groundwater from the perched system merges with the regional aquifer southeast of Tijeras Arroyo. The regional aquifer extends across the entire TAG study area and the Albuquerque Basin.

Low levels of TCE and nitrate have been detected in perched-system groundwater samples collected at TA-II. The regional aquifer is not contaminated.

The vicinity of TA-II is essentially flat, with a gentle slope to the west of approximately 4 percent. The soil is poorly developed with high alkalinity. The subsurface geology consists of unconsolidated alluvial and colluvial deposits derived from the Sandia and Manzanita Mountains. These upper Santa Fe Group deposits consist of sediments ranging from clay to gravel derived from the granitic rocks of the Sandia Mountains and greenstone, limestone, and quartzite derived from the Manzanita Mountains. The depth to Precambrian basement beneath TA-II is approximately 3,000 ft.

TA-II is situated approximately 50 ft in elevation above the floodplain of Tijeras Arroyo, which is the largest surface-water feature at KAFB. Site 48 is located approximately 1,700 ft west of the active channel of Tijeras Arroyo. Water flows in the active channel near TA-II several times per year.

Constituents of Concern

The COCs for ER Site 48 are volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), HE compounds, cyanide, RCRA metals, and radionuclides (gamma emitters and tritium).

Current Hazards

No hazards at the site are related to contamination of surface or subsurface soils.

Current Status of Work

The No Further Action (NFA) proposal for ER Site 48 was submitted to NMED in June 1995. Currently a RSI is being written.

Future Work Planned

The RSI response will be submitted in 2003, and will include the 2000 sampling results and a revised risk assessment. In 2004, waste in the HE catch box will be removed and characterized for disposition.

Waste Volume Estimated/Generated

Five 55-gallon drums of mixed waste were removed from the septic tank in 1995, and have been disposed off-site.

Information for ER Site 48 was last updated Jan 24, 2003.